

<b>Interview Summary</b>	Application No.	Applicant(s)	
	10/804,694	QUADLING ET AL.	
	Examiner	Art Unit	
	Gordon J. Stock	2877	

All participants (applicant, applicant's representative, PTO personnel):

(1) Gordon J. Stock.

(3) Gregory J. Toatley.

(2) Attorney David Judson.

(4) \_\_\_\_\_.

Date of Interview: 8/29/06.

Type: a) ☒ Telephonic b) ☐ Video Conference  
c) ☐ Personal [copy given to: 1) ☐ applicant 2) ☐ applicant's representative]

Exhibit shown or demonstration conducted: d) ☐ Yes e) ☒ No.  
If Yes, brief description: \_\_\_\_\_.

Claim(s) discussed: 17, 18, 23-25 and 30.

Identification of prior art discussed: \_\_\_\_\_.


Agreement with respect to the claims f) ☒ was reached. g) ☐ was not reached. h) ☐ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: See Continuation Sheet.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER OF ONE MONTH OR THIRTY DAYS FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.

  
\_\_\_\_\_  
Examiner's signature, if required

Continuation of Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: An Examiner's Amendment was discussed to overcome the rejections under 35 U.S.C. 101 and 112 second paragraph in 20060720. It was decided that claims 17 and 18 would be cancelled and that claims 23-25, 30 would have the optical element that detects or configured to detect to read 'a reflecting surface configured to capture or that captures' by Examiner's Amendment. See Examiner's Amendment attached and attached PTOL-413A with proposed amendment. In addition, since the interview has resulted in the allowance of the claims, no formal written reply including the substance of this interview is necessary..

## Summary of Record of Interview Requirements

### Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

### Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

### 37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,  
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

### Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

PTOL-413A (09-04)  
Approved for use through 07/31/2006. OMB 0651-0031  
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

### Applicant Initiated Interview Request Form

Application No.: 10/804,694 First Named Applicant: Quadling  
Examiner: Gordon Stock, Jr. Art Unit: 2877 Status of Application: non-final

#### Tentative Participants:

(1) David Tudson (2) \_\_\_\_\_  
(3) \_\_\_\_\_ (4) \_\_\_\_\_

Proposed Date of Interview: August 29, 2006 Proposed Time: 10:00 (AM/PM)

#### Type of Interview Requested:

(1) ☒ Telephonic (2) ☐ Personal (3) ☐ Video Conference

Exhibit To Be Shown or Demonstrated: ☐ YES ☒ NO

If yes, provide brief description: \_\_\_\_\_

### Issues To Be Discussed

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Issues (Rej., Obj., etc)	Claims/ Fig. #s	Prior Art	Discussed	Agreed	Not Agreed
(1) <u>5112</u>	<u>23-25, 30</u>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(2) _____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(3) _____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(4) _____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Continuation Sheet Attached					

#### Brief Description of Arguments to be Presented:

See attached

An interview was conducted on the above-identified application on 8/29/06.

NOTE: This form should be completed by applicant and submitted to the examiner in advance of the interview (see MPEP § 713.01).

This application will not be delayed from issue because of applicant's failure to submit a written record of this interview. Therefore, applicant is advised to file a statement of the substance of this interview (37 CFR 1.133(b)) as soon as possible.

Applicant/Applicant's Representative Signature

David H. Tudson

Typed/Printed Name of Applicant or Representative

30 467

Registration Number, if applicable

Examiner/SPE Signature

This collection of information is required by 37 CFR 1.133. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 21 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Quadling et al.  
Serial Number: 10/804,694  
Filing Date: March 19, 2004  
Art Unit: 2877  
Examiner: Stock, Jr., Gordon J.  
For: Laser digitizer system for dental applications

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

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**RESPONSE TO NON-FINAL OFFICE ACTION (DRAFT)**

The Examiner is thanked for the indication of allowable subject matter.

To address the remaining issues, please amend the application as follows:

**IN THE CLAIMS**

The following amendments to the claims are made pursuant to the requirements of 37 C.F.R. § 1.121(c). A claim listing is provided beginning on the next page of this response.

Please cancel claims 17-18 without prejudice or disclaimer.

Please amend claims 23-25 and 30 as set forth below.

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1. (previously presented) An intra-oral laser digitizer system comprising:  
a light source having collimating optics configured to generate a collimated beam of light;  
a scanner optically coupled to the light source and configured to scan the collimated beam along at least two axes to generate a pattern;  
an optics relay coupled to the scanner and configured to relay the pattern towards a remote object to be imaged;  
an image optics system having an optical axis configured to detect a reflection of the pattern from the remote object at an angle  $\theta$  with respect to the optics relay and to generate data representative of a surface of the object based on the reflection of the pattern; and  
a processor coupled to the scanner and the image optics system configured to generate a three-dimensional image of the object based on the data.

2. (original) The intra-oral laser digitizer of claim 1 where the light source comprises a laser LED.

3. (original) The intra-oral laser digitizer of claim 1 where the scanner comprises a plurality of mirrors.

4. (previously presented) The intra-oral laser digitizer of claim 3 where the image optics system comprises:

an image sensor configured to detect a triangulation image of the object, the triangulation image based on the pattern, wherein the pattern comprises a plurality of curves generated by scanning the beam of light on the remote object during an exposure period; and

an imaging lens system configured to focus the plurality of curves on the image sensor.

5. (previously presented) The intra-oral laser digitizer of claim 4 where the processor is configured to merge multiple images of the remote object to generate a three-dimensional map of the remote object.

6. (previously presented) The intra-oral laser digitizer of claim 5 where the remote object comprises any one of: an in vivo dental item, a dental preparation, a dental model, a dental

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mold, or a dental casting.

7. (original) The intra-oral laser digitizer of claim 1 where the scanner comprises a single mirror configured to scan the light along at least two-axes.

8. (original) The intra-oral laser digitizer of claim 1 where the scanner comprises a rotatable mirror and a spinning polygon mirror.

9. (previously presented) The intra-oral laser digitizer of claim 1 where the scanner further comprises a programmable position controller configured to control the scan of the collimated beam of light in a programmed scan sequence.

10. (previously presented) The intra-oral laser digitizer of claim 1 where the pattern comprises a plurality of curves, with each curve being substantially parallel to one another.

11. (previously presented) The intra-oral laser digitizer of claim 1 where the light source comprises a low coherence light source.

12. (previously presented) The intra-oral laser digitizer of claim 1 further comprising a voice recognizer to control a given operation in response to a voice command.

13-20. (cancelled)

21. (previously presented) The intra-oral laser digitizer as described in claim 1 wherein the pattern comprises a set of segments.

22. (previously presented) The intra-oral laser digitizer as described in claim 21 wherein each segment is a curve.

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23. (currently amended) The intra-oral laser digitizer as described in claim 1 wherein the image optics system comprises an image sensor, ~~an optical element that detects a reflecting surface that captures~~ the reflection of the pattern, and an optics relay coupled to the ~~optical element~~ reflecting surface and configured to relay the reflection of the pattern from the ~~optical element~~ reflecting surface to the image sensor.

24. (currently amended) The intra-oral laser digitizer as described in claim 23 wherein the optics relay coupled to the ~~optical element~~ reflecting surface is co-linear to the optics relay coupled to the scanner.

25. (currently amended) An intra-oral laser digitizer, comprising:  
a light source having collimating optics configured to generate a collimated beam of light;  
a scanner optically coupled to the light source and configured to scan the collimated beam along at least two axes to generate a pattern comprising a set of segments;  
a first optics relay coupled to the scanner and configured to relay the pattern towards a remote object to be imaged;  
~~an optical element configured to detect~~ a reflecting surface configured to capture a reflection of the pattern from the object at an angle  $\theta$  with respect to the first optics relay; and  
a second optics relay, co-linear to the first optics relay, the ~~second optics relay~~ coupled to the ~~optical element~~ reflecting surface and configured to relay the reflection of the pattern toward an image sensor.

26. (previously presented) The intra-oral laser digitizer as described in claim 25 wherein the image sensor generates a first data set representative of a surface of the object based on the reflection of the pattern.

27. (previously presented) The intra-oral laser digitizer as described in claim 26 wherein the scanner generates a second pattern comprising a set of segments, and wherein the



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image sensor generates a second data set representative of a surface of the object based on a reflection of the second pattern.

28. (previously presented) The intra-oral laser digitizer as described in claim 27 further including a processor, under program control, to generate a three-dimensional image of the object based on the first and second data sets.

29. (previously presented) The intra-oral laser digitizer as described in claim 25 further including a program-controlled processor that generates a representation of the object based on the reflection of the pattern as detected by the image sensor.

30. (currently amended) An intra-oral laser digitizer, comprising:  
a light source having collimating optics configured to generate a collimated beam of light;  
a scanner optically coupled to the light source and configured to scan the collimated beam along at least two axes;  
a first optics relay coupled to the scanner and configured to relay the scanned collimated beam of light towards a remote object to be imaged, wherein over a given scanning period the scanned collimated beam of light generates a pattern comprising a set of segments;  
an image sensor;  
~~an optical element configured to detect~~ a reflecting surface configured to capture a reflection of the scanned collimated beam from the object at a given triangulation angle  $\theta$ ; and  
a second optics relay, co-linear to the first optics relay, the second optics relay coupled to ~~the optical element~~ reflecting surface and configured to relay the reflection of the scanned collimated beam toward the image sensor, wherein over the given scanning period the reflection of the scanned collimated beam on the image sensor comprises a modified pattern.

31. (previously presented) The intra-oral laser digitizer further including a processor that uses the modified pattern, together with at least one other modified pattern generated as a result of scanning the collimated beam of light in a second pattern, to generate a representation of the remote object.

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**REMARKS**

The Examiner is thanked for his indication that claims 1-12 and 21-22 are allowed.

As to claim 23-31, the Examiner has indicated that these claims would be allowable if the rejection under 35 USC 112, first paragraph, were overcome. The rejection is premised on the phrase "that detects the reflection" used in the prior amendment. In this regard, the Examiner states that it is only the "image sensor" (as recited in the claims at issue) that actually "detects" the reflection, not the "optical component" as stated in the prior claim language. Note that the "optical component" identified in the previously presented claims was a reference to devices such as the third reflecting prism 106 [0043], which captures the reflection from the object. The language "detect" was believed to be appropriate given the specific wording in the written description in [0043] that "[t]he third reflecting prism 106 may be inserted into the oral cavity to detect or capture reflections of the laser pattern from the one or more dental items to be imaged." Nevertheless, to address the pending §112(1) rejection, each of claims 23, 25 and 30 has now been amended to change "optical element that detects" to "reflecting surface that captures." No new matter has been added, as the written description as originally filed clearly describes that the "third reflecting prism 106" (a preferred embodiment) has a "reflecting surface" and that the device provides the function of capturing the reflection.

With these changes, the Examiner's concerns regarding claims 23-31 should now be addressed, as the specification is in compliance with all requirements under 35 U.S.C. §112.

To advance this prosecution to a close, method claims 17-18 have been cancelled without prejudice or disclaimer.

A Notice of Allowance is respectfully requested.

Respectfully submitted,

By:

\_\_\_\_\_  
David H. Judson, Reg. No. 30,467